proper mixture of coal-gas and air. It became white hot, and continued so till the mixture had lost its inflammability. Mixtures of other inflammable gases afforded similar phenomena, and likewise several inflammable vapours, as those of ether, alcohol, oil of turpentine, and naphtha. In these experiments, platinum wire is most successfully used; for it does not tarnish, and its radiating powers are slight. Palladium answers nearly as well; but the phenomena are not witnessed when wires of silver, copper, or iron are employed. It is suggested that many theoretical views will arise from the connexion of the facts detailed in this communication with those presented to the Society in the author's former paper on flame; and practical applications may also flow from the same source. By hanging some fine platinum wire, for instance, above the wick of his safety-lamp, the coal-miner will be lighted in mixtures containing such excess of fire-damp as to be no longer explosive; and where the flame is extinguished, the metal will become sufficiently luminous to guide him, while its relative brightness in different parts of the mine will indicate the state of the air, and its fitness for respiration; for when the foul air forms two fifths of the volume of the atmosphere, the ignition of the wire ceases.

De la Structure des Vaisseaux Anglais, considérée dans ses derniers Perfectionnements. Par Charles Dupin, *Correspondant de l'Institut de France, &c. Communicated by the Right Hon. Sir* Joseph Banks, *Bart. G.C.B. P.R.S.* Read December 19, 1816. [*Phil. Trans.* 1817, *p.* 86.]

Being engaged in collecting materials for a work entitled "A Picture of Naval Architecture in the 18th and 19th Centuries," the author was induced to visit this country, with a view to become acquainted with the various innovations and improvements lately introduced here in the art of ship-building; and, in the present communication, offers some remarks upon the plans proposed by Mr. Seppings, an account of which has formerly been before the Royal Society, and is printed in their Transactions for 1814.

After giving an outline of the fundamental principles upon which Mr. Seppings's improvements in naval architecture principally depend, and dwelling especially upon the diagonal pieces of timber which he employs to strengthen the usual rectangular frame-work, the author proceeds to state that similar contrivances were long ago suggested and even practised by the French ship-builders, in order to give strength to the general fabric of their vessels. Instead of making the ceiling parallel to the exterior planks, they arranged it in the oblique direction of the diagonals of the parallelograms formed by the timber and the ceiling, in the whole of that part of the ship's sides between the orlop and limber-strake next the kelson. They then covered this ceiling with riders, as usual, and placed cross-pieces between them in the direction of the second diameter of the parallelogram. This system, however, was abandoned in the French

navy, on account of its expense, of its diminishing the capacity of the hold, and of the erroneous notion that the longitudinal length of the ship was diminished by the obliquity of the ceiling. In 1755, the Academy of Sciences rewarded M. Chauchot, a naval engineer, for the suggestion of employing oblique for transverse riders; and in 1772, M. Clairon des Lauriers employed diagonal strengtheners in the construction of the frigate l'Oiseau.

Having cited these and other instances to prove that Mr. Seppings's principle is not new, at the same time allowing that the merit of rendering its utility probable, and of overcoming many difficulties in its execution, is due to that gentleman, the author proceeds more particularly to inquire how far it contributes to strengthen the vessel, so as to enable it to oppose changes of form from the action of external powers. If every elementary part of the vessel rested immediately on the sea, it would displace its weight of water, and would only be submitted to the slight pressure of the fluid. But as only a part of the external surface of the vessel is in contact with the water, this part is called upon to support a degree of pressure of the fluid capable of counteracting the weight of the whole mass. Hence the vessel becomes convex or arched, the curve extending from the head to the stern; but as this bending is not of constant magnitude, it is evident that, in order to apportion the resistance adequately, the strength must be made greatest where there is the greatest strain. The author furnishes some new theorems for the determination of these points, and thence concludes that the point of greatest curvature lies between the quarter-deck and forecastle, across the gangways, and much nearer the head of the ship than is commonly supposed; and that the effect of the arching is to diminish the fastness of sailing, and to increase the difficulty of performing evolutions, especially with the sails. As vessels, therefore, must inevitably suffer by this effect of arching, any method of diminishing that tendency must be valuable. M. Dupin suggests a method by which it might be ascertained whether Mr. Seppings's plan is calculated to diminish the tendency of vessels to arch; upon which subject he deems Mr. Seppings's experiments, detailed in the Philosophical Transactions, as unsatisfactory. This method, however, has not hitherto been tried, and the question, consequently, cannot be decided upon. In the meantime, says the author, there is every reason to suppose that it would prove favourable to Mr. Seppings's plan.

On a new Fulminating Platinum. By Edmund Davy, *Esq. Professor of Chemistry, and Secretary to the Cork Institution. Communicated by Sir* Humphry Davy, *LL.D. F.R.S. V.P.R.I.* Read February 13, 1817. [*Phil. Trans.* 1817, *p.* 136.]

After pointing out certain analogies between gold and platinum, which rendered it probable that the latter metal would afford a fulminating compound similar to that obtained from the former, Mr.